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OBSERVATIONS ON JUPITER AT THE OPPOSITION, 1915.

EDISON PETTIT.

THE following observations on Jupiter were begun with the Yerkes forty-inch telescope and completed with the Washburn College twelve-inch telescope and position micrometer. The observations were made (1) to determine the rotation period in various latitudes where markings of definite character might be found; (2) to determine the polar compression; (3) on the "great red spot"; (4) to measure the diameters of satellites; (5) to determine the character of any markings on the satellites.

GENERAL FEATURES.

From twenty-five observations, a map in Mercator projection was drawn. This takes system II of the Ephemeris as a basis of the longitudes. The quadrant from 180° to 270° was not well observed. Since the planet was near equinoctial, observations were confined to positions near the meridian. Powers of 750 and 1,000 were used on the forty-inch, and all observations with the twelve-inch were made with a power of 1,000. Very clear weather during October and November greatly focilitated observation. Especially clear weather was taken advantage of to measure the satellites, which otherwise flared too much.

Almost all the surface features lie between the 30° parallels of latitude. Plumelike markings were a quite prominent feature. A peculiar marking was observed on many nights in the southern band, longitude 300° to 360°, latitude —15° to —30°, like a grove of trees. Attention is especially called to two small dark spots, the following one in longitude 309.8°, latitude 15° north. This latter is especially adapted to the determination of rotation period, being small and round and of considerable depth of color. Its actual diameter is 2,100 miles, about that of the moon.

A faint line running around the planet in latitude 32° north is widened to a short, thick band in longitude 85° to 105°. This is also well adapted to the determination of the rotation period. The white spots in the neighborhood of longitude 345° were brilliant and in general of a lemon shape.

THE ROTATION PERIOD.

In measuring the rotation period both transits over the central meridian and elongations of the marking were observed. For the transit observations the double value of the equatorial diameter was measured as usual, and the micrometer set to one-fourth this value minus one-half the wire correction. As the marking approached the central meridian it was tested by setting first the right, then the left wire tangentially till the eye was satisfied that the central meridian had been reached and the time recorded to the nearest tenth of a minute. The elongation measures were reduced to the time of central transit. The reductions show that the elongations will give as accurate values of the rotation period as the transits, if the seeing is good enough to permit rapid measurement.

From an elongation of the round spot, longitude 309.8°, latitude 15.0° north, on September 21, and a transit of October 29, the value $T = 9^{h.}\ 55^{m.}\ 40.76^{s.}$, or an acceleration of $1.1^{s.}$ per degree of latitude in this region.

THE POLAR COMPRESSION.

Twenty-five observations were made for the polar compression, of which ten were rejected on plotting the risiduals. From the fifteen remaining, the value $1/17.4 \pm 1/270.3$ was obtained. This is a probable error of 6.4 percent.

THE GREAT RED SPOT.

The "great red spot" was quite distinct at times, showing a dull brick-red color. Its measured position was longitude 131.7°, latitude 23.0° south, length 29,275 miles. A peculiar group of plumes follows it. The ends of the spot had quite sharp points.

THE SATELLITES.

On two nights the images were quite free from flaring. The means of the measures are: I = 2614 mi., II = 2233 mi., III = 3908 mi., IV = 3422 mi.

Markings were observed on III and IV. Attention was especially attracted to III. On two occasions, October 21.419 and October 29.458 C. S. T., a marking was distinctly seen. The angle the straight side of the marking makes with the plane of the planet's equator being 70°. It will be noticed that the time between the observations is nearly equal to the revolution period of the satellite, which seems to indicate that the satellite keeps the same face towards the planet during its revolution and that the marking is always turned away. It would be interesting to see if this feature is a permanent one at the coming October opposition, which will be the nearest approach of the planet in twelve years.

WASHBURN COLLEGE OBSERVATORY, TOPEKA.

CELESTIAL PHOTOGRAPHY WITH THE WASHBURN TELESCOPE.

EDISON PETTIT.

DURING the past year preparations were made to adapt the Washburn College refractor to celestial photography. Some preliminary attempts showed that the telescope, which has an 11½-inch Brashear objective, was capable of producing good photographic images. With this in view, a double-slide plate holder was built in the college shop, which makes accurate guiding possible.

A brass collar fits over the 4½-inch draw tube, and to this is attached a brass plate which may be rotated in position angle. To this plate is attached the double-slide plate holder with guiding eyepiece and shifting screws. A plate-carrier opening in the back provides means of bringing the film to exact focus. The cross wires are No. 60 copper and illuminated with a flash-light bulb which receives current from the 11-volt a. c. telescope circuit, and may be adjusted through a potentiometer. The carrier takes 3 by 3½ in. plates.

With this form of plate holder the guiding is done on the same field of stars that is being photographed, and the corrections to the clock motion are made by shifting the whole plate and not the telescope. The field having been selected, a guiding star is found and set on the cross wires, a plate cut and inserted, and the slide cover drawn. The star is now kept on the cross by manipulating the two shifting screws, which move the plate in two directions at right angles to each other.

To facilitate photographic and other astronomical work the dome has been provided with a ½ hp. a. c. motor for revolving it. The starting box and reversing switch are placed on the side of the observing ladder, so that the observer need not leave the guiding eyepiece to shift the dome. A centrifugal friction